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**FINAL
OPERATION AND MAINTENANCE PLAN
SECOND OPERABLE UNIT
SULLIVAN'S LEDGE SUPERFUND SITE
NEW BEDFORD, MASSACHUSETTS**

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**FINAL OPERATION AND MAINTENANCE PLAN
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1.0 INTRODUCTION

In accordance with Section VIII.C.1.d.iii (c) of the Scope of Work for Operable Unit 2 (SOW-OU2) (USEPA 1992a) of the Sullivan's Ledge Superfund Site in New Bedford, Massachusetts, and the approved Remedial Design (RD) Work Plan (Dames & Moore 1995a), this final Operation and Maintenance (O&M) Plan has been prepared for AVX Corporation as part of the 100% Remedial Design. Section VIII.C.1.d.iii (c) of the SOW-OU2 details the following requirements:

- (c) *a draft Operation and Maintenance Plan designed to ensure the long-term continued effectiveness and permanence of the remedial action that shall include*
 - i. *the items in (a) through (d) below:*
 - (a) *sediment / soils, wetlands, and air monitoring adequate to monitor the effectiveness of the Second Operable Unit Remedy;*
 - (b) *compliance with other applicable state and federal requirements*
 - (c) *requirements described in Section VI.A.5., 6. and 7. (wetland restoration assessment and wetland maintenance) of this SOW;*
 - (d) *submittal of yearly reports in accordance with Section VII.G.3 (yearly review of institutional controls) of this SOW that describe the results of the monitoring of implementation and effectiveness of the institutional controls specified in Section VII.F. of this SOW.*

Section VIII.C.1.d.iv.(c) further requires that a "final Operation and Maintenance Plan consistent with Section VIII. C.1.d.iii(c)" be included in the 100% Remedial Design.

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This final O&M Plan is intended to address long-term reviews of the remedy performance after USEPA approval of the Final Remedial Construction Report, and does not address the short-term maintenance requirements during construction (which will be addressed by the Environmental Monitoring Program in the Remedial Action Work Plan (RAWP)). Portions of this final O&M Plan are contingent upon the actions undertaken during the implementation of Operable Unit 1 (OU1). It should therefore be understood that this document will be amended or revised at the time of the Final Construction Inspection.

1.1 ENVIRONMENTAL MONITORING PROGRAM REQUIREMENTS

Section VIII.C.1.d.iii(c)i.(a) of the SOW-OU2 states that this O&M Plan should address environmental monitoring with respect to *"sediments/soils, wetlands, and air monitoring adequate to monitor the effectiveness of the Second Operable Unit Remedy."* Detailed requirements for environmental monitoring are also presented as RA requirements in Section IX.B.1.d of the SOW-OU2. Table 1-1 presents a synopsis of the Section IX.B.1.d environmental monitoring program requirements, and how each requirement will be addressed in the O&M Plan or RA Work Plan.

1.2 REPORT ORGANIZATION

This O&M Plan has been organized to correspond with the four major requirement from the SOW-OU2 listed above. Part 2 contains the Post-Construction Environmental Monitoring Plan, Part 3 contains the ARAR Review, Part 4 contains the Post-Construction Wetlands Monitoring Plan, and Part 5 contains the Institutional Controls Review. A description of the anticipated routine O&M procedures and contingencies is included in Part 6. Part 6 also provides the O&M

organization, inspection schedules and reporting procedures which will be followed during the O&M period.

2.0 POST-CONSTRUCTION ENVIRONMENTAL MONITORING PLAN

This plan summarizes the scope and procedures for accomplishing the post construction O&M required by the SOW-OU2. Section VIII.C.1.d.iii (c) i. (a) of the SOW-OU2 indicates that the environmental monitoring shall include "*sediment / soils, wetlands, and air monitoring adequate to monitor the effectiveness of the Second Operable Unit Remedy*"; The O&M Plan, including this Section 2, is an RD requirement according to the SOW-OU2. Results of the post construction environmental monitoring program will be reported to EPA in annual O&M reports. These reports are described further in Section 6.4 of this plan.

2.1 SURFACE WATER, SEDIMENT AND SOILS

Surface water, sediments, and wetland soils/sediments will be monitored during the period of O&M as described in the following subsections. Samples will be collected for analysis once a year during the first three years, and in year five. At the conclusion of the first five years after completion of construction, and completion of the first five year review in accordance with Section VI.A.5. of the SOW-OU2, sampling frequency will be reduced to one event every two years.

2.1.1 Surface Water

A total of four surface water samples will be collected from reaches of the Unnamed Stream within the area of OU2 impacted by the RA construction. These samples will be collected to identify any stream related impacts to Middle Marsh and the Adjacent Wetland. The approximate locations for collection of the surface water samples are shown on Figure 2-1, and are generally located (1) where the Unnamed Stream enters the Adjacent Wetland, (2) where the Unnamed Stream exits the Adjacent Wetland,

(3) where the Unnamed Stream enters Middle Marsh, and (4) where the Unnamed Stream exits Middle Marsh. These locations were selected because they bound the areas where a more aquatic or semi-aquatic environment is to be restored. Surface water samples will be analyzed for pH and for PCBs. Both filtered and unfiltered samples will be analyzed. Analytical methods are presented in Table 2-1.

2.1.2 Sediment

A total of four sediment samples will be collected from reaches of the Unnamed Stream within the area of OU2 impacted by the RA construction. Sediment sampling locations will coincide with the surface water sampling location described above, and shown on Figure 2-1. Sediment samples will be analyzed for PCBs and for total organic carbon (TOC) in accordance with Section VII.A. of the SOW-OU2. Analytical methods are presented in Table 2-1.

2.1.3 Wetland Soils/Sediments

A total of two wetland sediment/soils samples will be collected from the Adjacent Wetland, and a total of four sediment/soils samples will be collected from Middle Marsh during each sampling event. During the performance evaluation period, the first three years after construction is complete, and in year five, sample locations will coincide with those required in the Wetland Restoration Monitoring Plan (Section 4 of this O&M Plan). Sample locations will be selected in late summer sampling rounds within the sampling quadrats established to evaluate the restoration of wetland vegetation. Areas with evidence of recent sediment deposition will be chosen. Sediment/soil sample locations will be located in the field and will be placed in the hollow, pool areas between the hummocks. Actual selection of the locations will consider probable depositional areas, recent flood history for the Unnamed Stream,

and results of previous sampling rounds. Samples will not be taken within ten feet of the Unnamed Stream, as stream monitoring is included above and in OU1.

Sediment/soil samples will be analyzed for PCBs. Analytical methods are presented in Table 2-1.

2.2 AIR MONITORING PROGRAM

A draft Air Monitoring Investigation Report was included in the 95% Pre-final RD as part of the draft Implementation Plan. This report evaluated the potential sources of fugitive emissions, and the resultant ambient air concentrations, and included an evaluation of these concentrations relative to ARARs and published exposure limits. This report concluded that the conditions during remedial action will result in ambient air concentrations that do not exceed ARARs or cause an unacceptable hazard to air quality. Because emissions during the post-closure period will be significantly less than during RA, continued air monitoring after the completion of construction is not proposed.

2.3 DATA EVALUATION AND CORRECTIVE ACTION

Collected surface water data will be compared to data from previous monitoring rounds, upstream data, and data generated under the O&M program for OU1. Trends will be noted and data which constitutes an outlier or aberration will be flagged for further evaluation. Based on these comparisons and evaluations, the need for corrective action will be reported, and potential corrective measures, if appropriate, will be proposed to EPA.

Similarly, collected sediments/soils data will be compared to data from previous monitoring rounds, OU1 data, and the site-specific Cleanup Standards and Performance Standards. Trends will be noted and data which constitutes an outlier or aberration will be flagged for further evaluation. Based on these comparisons and evaluations, the need for corrective action will be reported, and potential corrective measures, if appropriate, will be proposed to EPA.

2.4 PROGRAM MODIFICATION

In accordance with Section VII.A. of the SOW-OU2, the sampling frequency, analytical parameter, and monitoring reporting requirements may be modified by the U.S. Environmental Protection Agency (USEPA) in consultation with Massachusetts Department of Environmental Protection (MADEP). In accordance with Section VI.A.5. of the SOW-OU2, if sampling results and observed trends indicate that the effectiveness of the remedy has not changed with time, a written request to reduce the scope of environmental monitoring will be submitted for USEPA/MADEP approval.

3.0 ARAR REVIEW

Section VIII.C.1.d.iii (c)i(b) of the SOW-OU2 indicates that the O&M Plan shall include "compliance with other applicable state and federal requirements". Table 3-1, presents a synopsis of the ARARs from the OU2 Record of Decision and an analysis of each requirement's application to the activities that can reasonably be anticipated during the O&M period. An ARARs Analysis Report was prepared and submitted under separate cover as part of the 95% Design to address the compliance with these same requirements during remedial action.

4.0 WETLAND RESTORATION MONITORING

Long-term monitoring of wetlands shall be conducted to ensure the long-term effectiveness of the wetland restoration program as required by Sections IV.A.5., 6., and 7. Monitoring will be performed in accordance with the requirements of the ROD (Section X.B.1.) and the SOW-OU2 (Section VII.A.) and the procedures described in Section 4.0 of the Wetland Restoration Plan (Appendix H of the approved 30% RD). The Mystic Valley Amphipod will be used as a biological indicator species. This monitoring program will, therefore, consist of two general components: success of restoration of the vegetation and success in restoration of Mystic Valley Amphipod habitat. Other characteristics of the restored wetland areas will be assessed to evaluate the restoration of other wetland dynamics which bear directly on the potential of the restoration efforts to meet the Performance Standards.

4.1 WETLANDS VEGETATION

Monitoring of Performance Standards for wetlands vegetation will be conducted using the same methodology employed in the Wetlands Baseline Characterization Study (Earthplans and Dames & Moore 1996). This monitoring will take place annually the first three years following restoration of wetlands within Middle Marsh and the Adjacent Wetland, in year five, and every five years thereafter. Representative sampling quadrats will be selected in each wetland cover type, and the percent coverage for each strata will be measured. This monitoring event will take place at the end of the growing season, late August or early September, in each year. Within the Adjacent Wetland, two sampling quadrats will be established in each of the two cover types that were restored, scrub-shrub and emergent.

Within each of the cover types sampling quadrats, plant cover and dominance will be visually estimated and recorded for each vegetative stratum, i.e., scrub-shrub and herbaceous following the methodology used in the Wetlands Baseline Characterization Report, i.e., the New England Division Army Corps of Engineers (1991) wetland delineation guidelines. Within Middle Marsh four representative 100-foot-square quadrats, corresponding to the original grid system, will be established. In each of the four 100-foot-square grids a visual estimate of relative proportion of hummocks to lower lying open areas will be made. In addition, one hummock area and one pool, or hollow, area will be selected from each of the four 100-foot-square grids, for evaluating plant cover and dominance using the same methodology used in the Wetlands Baseline Characterization Study (Earthplans and Dames & Moore 1996), i.e., the New England Division of Army Corps of Engineers (1991) wetland delineation guidelines. Sampling quadrats in both the Adjacent Wetland and Middle Marsh will be documented by photographs from fixed stations.

The results will be evaluated to determine if an overall 75% areal coverage for all wetland species collectively is achieved. If the measured percent cover meets or exceeds the 75% performance standard, the wetlands restoration will be considered successful.

At the end of the fifth growing season and subsequently every five years following the initiation of wetlands restoration, monitoring of all wetlands vegetation as well as a focused monitoring of the condition of tree species will take place on four 100-foot square grids in Middle Marsh. In addition to sampling discussed previously in this O&M Plan, all tree species heights, DBH and canopy area will be estimated. These results will be compared to baseline data collected during the Wetlands Baseline Characterization Study.

In addition, the condition of the trees will be evaluated by an experienced wetlands biologist to determine whether they appear to be healthy and of the size and structure normal for their age and species.

If the results of this monitoring indicate that the tree species are healthy and maturing at a rate within the range of natural variability for the species, then, with the concurrence of USEPA and MADEP, the wetlands monitoring study will be terminated. If the trees do not appear to be healthy and/or growing normally, then AVX will submit a plan and a time table for corrective action and further monitoring. AVX and the City of New Bedford will implement this plan upon approval by USEPA.

4.2 MYSTIC VALLEY AMPHIPOD

Monitoring of Performance Standards for the Mystic Valley Amphipod will be conducted using similar methodology to that employed in the Pre-Design Investigation for the Mystic Valley Amphipod (Dames & Moore 1995d). For the first three years following restoration of wetlands within Middle Marsh and the Adjacent Wetland, representative sampling will be conducted annually in the spring from mid-April to mid-May to evaluate whether the Mystic Valley Amphipod is present.

Two sweeps, approximately 3-feet-long, will be made in representative wetland areas using a mesh dip net approximately 10 inches in diameter. These areas will include those newly restored as well as those that were not impacted by excavation. At least two areas in the Adjacent Wetland and five areas in Middle Marsh will be sampled. The following information will be recorded in the field:

1. condition of sampling site, including clarity of water,
2. presence of emergent vegetation, and
3. presence of organic layer at bottom of pool areas.

Any amphipods collected will be retained and returned to the laboratory for identification. Identifications of amphipods will be verified by Mr. Douglas Smith who verified Mystic Valley Amphipod identification in the baseline study of the presence of the Mystic Valley Amphipod (Dames & Moore 1995d).

4.3 WETLANDS HYDROLOGY

In order to measure water levels in the root zones of the restored wetlands, six stations have been established, two of which are in areas which will not be excavated, three of which are in areas of excavation within Middle Marsh and one of which is in the area of excavation of the Adjacent Wetland (Figure 4-1). The piezometer locations have been chosen to represent varying cover types and distances from the course of the Unnamed Stream. The objective of this monitoring program is to determine whether restored wetland sediments, particularly in the root zones of restored vegetation, replicate the water retention characteristics of the pre-existing wetland sediments.

Piezometers were installed in August 1996 as depicted in Figure 4-2. The piezometers were constructed using 1-inch-diameter PVC screen and riser materials. The screened section of the piezometer extends from 1 to 3 feet below ground surface. To limit the potential for settlement of the piezometer, a section of PVC riser was placed below the screened section and extends downward to the sandy subsoil. A 6-inch bentonite seal was placed around the bottom 6 to 12 inches of the lower riser to limit flow from the underlying sandy subsoil. The annular space above the bentonite was backfilled with

drainage sand to a depth of 6 inches below existing ground surface. A second bentonite seal was placed from 6 inches to the ground surface to limit the potential for downward migration of surface water. Each piezometer is secured with a locking plug. As shown in Figure 2, each well is also equipped with a vent port to allow for equilibration of ground water while the plug is installed.

Two weeks after installing the piezometers, giving time for equilibration, water levels were measured. Water levels were subsequently measured in October 1996. Water levels will again be measured four times in 1997, at approximately six-week intervals, between mid-April and mid-October. After wetland restoration is complete, disturbed piezometers will be reinstalled and measurements taken four times per year between April and October in the following years, until the third year following wetlands restoration. Water levels in the piezometers will be measured after a period of at least two days without rain. Results of measurements in the piezometers will be compared to one another and to OU1 monitoring wells MW-6A, MW-7, MW-20 and MW-10A and reported in the annual data reports to U.S. EPA and MADEP. If a situation occurs in which the growth of wetlands vegetation is unsuccessful, the results of the water level measurements in these piezometers will be reviewed to see if that offers an explanation for the observed effects. At the completion of all monitoring, a report will be prepared for review by U.S. EPA and MADEP that will detail and evaluate monitoring results and will provide recommendations, if appropriate, based on those results.

4.4 OTHER WETLAND CHARACTERISTICS

In addition to implementing the requirements of the monitoring program, the following information will be collected during sampling events in both the spring and late summer.

- A qualitative assessment of the growth and health of the plants used for restoration including observations of root, shoot, and branch growth and evidence of flowering. Any evidence of stress will also be documented.
- A qualitative assessment of the condition of the hummocks. This will include a general description of whether the hummocks have maintained their integrity and whether they have been colonized by additional species.
- Photographic documentation of the restored sites from fixed stations. These stations will be selected after restoration has been completed to incorporate any variability that won't be obvious until after restoration is complete.
- Assessment of invasive species. Since one of the objectives of the restoration plan will be to limit the invasion of opportunistic species, e.g., Phragmites), purple loosestrife, cattail and grape, their presence will be noted and they will be removed either by cutting or by controlled spraying with an herbicide, e.g., Rodeo (see Section 4.3.).
- Assessment of erosion. Erosion will be assessed by measuring grade stakes that were placed during planting of the wetlands vegetation. (See Section 3.4).

4.5 CORRECTIVE MEASURES

If unanticipated problems occur that are detected during the site visits, they will be corrected using the measures discussed in this section. Potential problems will likely fall into one of the following categories:

- Death or failure of plants to properly grow.
- Excessive plant damage caused by animals.
- Invasion of opportunistic plant species into restoration areas.

- Erosion of an amount of topsoil/backfill that modifies the topography of restoration areas to a degree that it would affect the success of restoration in those areas.
- Temporary interference with hydrological regimes of Middle Marsh.

4.5.1 Replacement of Plants

Any dead or moribund plants will be replaced at the earliest possible time consistent with the growing season, as necessary, to achieve a minimum of the original plant density. Any bare areas observed will be identified and replanted or reseeded as necessary.

4.5.2 Invasive Species

Since several opportunistic species, such as Phragmites, cattail, and purple loosestrife, are currently found in the Adjacent Wetland and Middle Marsh, there is a good possibility that the newly restored wetland areas will be invaded by them in the initial stages of the wetland restoration. Because these species are typically more successful at colonizing newly disturbed areas, they must be controlled or they will dominate the newly restored areas to the exclusion of other species. Since this is an undesirable situation, invasion of these species will be controlled using both manual removal and selective use of herbicide.

Invasive species will therefore be manually removed during each of the monthly site inspections. If manual removal is not successful, an herbicide such as Rodeo will be utilized. If an herbicide is used, it will be applied manually, by wiping the plants and not by spraying. A Massachusetts permit for herbicide application will be obtained in anticipation of the necessity to use it.

4.5.3 Topsoil Replacement

Minor repairs of eroded topsoil will be made using hand tools and wheelbarrows. If unanticipated, uncontrolled erosion occurs that requires heavier equipment to re-access the restored areas, USEPA and MADEP will be consulted with to evaluate damage and develop an action plan to restore damaged areas in a manner that minimizes the impact to restored wetland areas.

4.5.4 Operable Unit One Ground Water Treatment and Sedimentation Ponds

As OU1's plan for Management of Migration (O'Brien & Gere 1996) requires a ground water treatment system using pump and treat, there is the potential that the operation of such a system could have an effect on the water table in the restored wetlands. This potential is considered minimal, particularly since OU1 will be installing a slurry cutoff wall between the ground water extraction system and the wetlands. However, if a water table drawdown does occur, it could affect the plants currently growing in the restored wetlands as well as the species composition of those colonizing the restored wetlands, i.e., it would establish conditions that may favor upland plants. Such a situation is beyond the control of AVX.

Similarly, since the wetlands in Middle Marsh and the Adjacent Wetland depend upon periodic flooding to maintain their character, the use of a sedimentation pond by OU1 could limit this periodic flooding. While this may be desirable to limit the potential for erosion during the early stages of wetland restoration, it would have a negative effect on the success of restoration in the long-term. The best situation for the long-term is if there would be no modification of natural flooding events in Middle Marsh and the Adjacent Wetland.

4.6 REPORTS

As required by the SOW-OU2 (Section IX.B.1.d.ii.), annual reports will be submitted for USEPA review regarding the results of monitoring activities for both wetlands vegetation and the Mystic Valley Amphipod.

4.6.1 Wetlands Vegetation

Reports regarding wetlands vegetation will be submitted within 120 days following completion of the late summer monitoring activities. The report on monitoring activities after the first and second growing season will be an interim data report. The report following the third growing season will be a final report and will summarize and interpret all of the monitoring data. Each report will include a summary of the percent cover of herbaceous and woody vegetation and compare it to baseline pre-remediation conditions. In addition, separate sections of the report will discuss:

- Colonization of restored wetland areas by "volunteer" species,
- A qualitative assessment of the growth and health of plants and grasses used for restoration,
- A qualitative description of the condition of the hummocks and their vegetation,
- A qualitative description of hydrological characteristics in the restored wetlands focusing on the ability of the restored wetland sediments to maintain moisture,
- A tabulation and evaluation of piezometer data,
- Any corrective measures taken to control invasion of opportunistic species, and

- Any corrective measures taken to achieve the level of cover required by the SOW.

The monitoring report will compare the wetlands vegetation level of cover relative to the Performance Standards (Section 4.1). If the level of cover (75% area coverage) is not achieved, then, as required by the Performance Standards in the SOW-OU2 as well as those proposed in the Wetlands Restoration Plan, a plan for achieving the Performance Standards will be submitted to the agencies for review and monitoring inspections and reports continued as specified in that plan.

4.6.2 Mystic Valley Amphipod

Reports regarding the Mystic Valley Amphipod will be submitted annually with the Wetland Vegetation Report and the remainder of the annual O&M Report. Since the Performance Standard for the Mystic Valley Amphipod habitat restoration is its presence in wetland areas of the Adjacent Wetland or Middle Marsh following wetlands restoration, reports will continue annually until its presence is documented or for three years, whichever is longer. If at the end of three years following completion of wetlands restoration the Mystic Valley Amphipod's presence is not documented, then, in accordance with the Performance Standards in the SOW-OU2 as well as those proposed in the Wetland Restoration Plan (Appendix H to the approved 30% RD), either a plan and timetable for its re-establishment or a report which documents why re-establishment of this species is impracticable, as discussed in Section 4.1, will be submitted for agency review.

The monitoring report will discuss the results of sampling for the Mystic Valley Amphipod and will include:

- A summary of the general conditions of the sampling locations compared to baseline Mystic Valley Amphipod habitat as documented in Dames & Moore (1995d).
- Documentation of the presence or absence of the Mystic Valley Amphipod at sampling stations both within newly restored wetland areas or in wetland areas outside of the excavated areas.

5.0 INSTITUTIONAL CONTROLS

Section III.6. of the SOW-OU2 states that the remedy shall include "institutional controls to prevent future residential use and non-recreational commercial use, and to restrict access to Middle Marsh and the Adjacent Wetland." Access restrictions during the post-closure period will include maintenance of the site security fence. Institutional controls, as further defined in Section VII.F. of the SOW-OU2, are to include City of New Bedford actions to restrict ground water use, and deed restrictions on the property within OU2.

The SOW-OU2 addresses institutional controls in other sections as well. The closure requirements, Section VII.G.3. state that "Settling Defendants shall conduct yearly reviews to monitor implementation of the institutional controls specified in Section VII.F. of this SOW and to check on the adequacy of the institutional controls." Section VIII.C.1.d.iii.(c)i.(d) of the SOW-OU2 reiterates that the O&M Plan shall include "submittal of yearly reports in accordance with Section VII.G.3. of this SOW that describe the results of the monitoring of implementation and effectiveness of the institutional controls specified in Section VII.F. of this SOW."

Accordingly, O&M activities will be conducted during the post-closure period to address two components: 1) maintenance of measures to restrict site access and 2) inspections for compliance with institutional controls such as deed restrictions.

5.1 SITE SECURITY INSPECTIONS

The site security measures (fence and warning signs) installed in accordance with the Phase II Site Security Plan (Dames & Moore, 1996) will be relocated at the conclusion of construction to surround only the Middle Marsh and Adjacent Wetland. These

remaining security measures will be maintained to restrict access in the post-closure period. The fences, gates and warning signs will be inspected on a quarterly basis. Necessary repairs and replacement of fencing and warning signs will be completed as quickly as possible, with minor hand repairs completed during the inspection. Results of the site security inspections will be reported to USEPA and MADEP on an annual basis.

5.2 INSTITUTIONAL CONTROL COMPLIANCE VERIFICATION

An inspection of the site will be conducted once each year to verify that the deed restrictions, ground water use restrictions and other requirements of institutional controls have not been violated and remain effective. In addition to the site inspection, the appropriate officials of the City of New Bedford and/or the Registry of Deeds will also be contacted as necessary. Results of the institutional control compliance monitoring will be documented annually to USEPA and the MADEP. If any institutional controls are found to be inadequate, USEPA will be notified within 30 days of the annual inspection, in accordance with Section VII.G.3. of the SOW-OU2. In accordance with Section VII.G.3 of the SOW-OU2, AVX may elect to request a reduction in the frequency of inspection or to demonstrate that such inspections are no longer needed.

6.0 OPERATION & MAINTENANCE PROCEDURES

6.1 ORGANIZATION

The City of New Bedford (City) will be responsible for implementation of the O&M Plan. Dames & Moore, acting on behalf of AVX, will review reports resulting from the O&M Plan. The City will conduct site security, institutional controls, inspections, environmental monitoring and wetland restoration evaluations. Annual reports during the O&M period will be prepared and submitted by the City and reviewed by Dames & Moore acting on behalf of AVX.

The City's Project Manager will have overall responsibility for management of the O&M program. Site inspections, maintenance operations and monitoring activities will be performed by personnel chosen on the basis of relevant experience for performing such work. Inspection and monitoring checklists will be completed for each event, signed by the authorized field supervisor, and verified by the City's Project Manager. Corrective measures, maintenance and repair work will be undertaken promptly by the appropriate field supervisor and documented in the annual report. Dames & Moore, on behalf of AVX, will provide quality assurance through review of the annual reports prepared by the City.

6.2 INSPECTION AND MONITORING SCHEDULE

Post-closure activities for OU2 will begin upon USEPA's approval of the Final Remedial Construction Report in accordance with the Section X of the SOW-OU2. Post-closure activities will continue over a minimum of a five-year period. The City and AVX may elect to demonstrate that O&M activities are no longer required after

the first five years and request USEPA approval to modify or discontinue such activities.

During the first five years following completion of construction, site inspections as described in this section will be undertaken on a quarterly basis. The inspection events will vary by season, as described in the following subsections. Table 6-1 contains the O&M schedule through the first five years of implementation.

6.2.1 Spring Inspection/Monitoring

In addition to a general inspection of site conditions, during the first three years of the O&M period, the Spring inspection will include wetland evaluation, including MVA monitoring, in accordance with Section 4 of this O&M Plan, and inspection of site security measures in accordance with Section 5 of this O&M Plan. Beginning in year four, and for the remainder of the O&M period, the spring event will include only the inspection of general conditions, site security measures, and wetland evaluation. MVA monitoring will not be conducted after the end of the third year. Spring inspections will take place in late April or early May.

6.2.2 Summer Inspection/Monitoring

In addition to a general inspection of site conditions, during the first three years of the O&M period and in year five, the summer inspection will include environmental monitoring in accordance with Part 2 of this O&M Plan, wetland evaluation in accordance with Part 4 of this O&M Plan, and inspection of site security measures in accordance with Part 5 of this O&M Plan. After year five, summer inspections will include only the inspection of general conditions and site security measures. Summer inspections will take place in August.

6.2.3 Fall Inspection

Fall events will include a general inspection of site conditions, field verification of Institutional Controls and inspection of site security measures in accordance with Section 5 of this O&M Plan. Fall inspections will take place in November.

6.2.4 Winter Inspection

Winter events will include a general inspection of site conditions, and inspection of site security measures. Winter inspections will be eliminated after the third winter of the O&M period. Winter inspections will take place in February.

6.3 INSPECTION AND MAINTENANCE PROCEDURES

The OU2 areas, Middle Marsh and the Adjacent Wetland, will be inspected and maintained throughout the O&M period in accordance with the above schedule. Sample inspection checklists and maintenance schedules for each component are included in Appendix A. The individual components of the seasonal inspections will be completed using the following procedural guidelines.

6.3.1 General Site Conditions

The site will be inspected and general site conditions evaluated, particularly for:

- Visible debris, litter and solid waste
- Integrity of surface features and evidence of erosion
- Loss of vegetative cover or growth of undesirable species in upland areas
- Accumulation of debris or obstructions in waterways

Minor maintenance and hand repairs, such as debris removal, pruning, mowing, weeding or raking will be completed during the inspection. Conditions requiring more extensive repair or maintenance will be reported to the City's Project Manager within 24 hours of the inspection. Subsequent corrective measures will be undertaken within 10 days, or on an alternate schedule approved by the EPA Remedial Project Manager.

6.3.2 Environmental Monitoring

Environmental monitoring will be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The SAP will be included in draft as part of the RAWP. Upon approval by USEPA, in consultation with MADEP, the SAP will be appended to the final O&M Plan for implementation.

In addition, the City's O&M Project Manager will request, on an annual basis, the results of the long-term monitoring conducted during the preceding year by OU1. Applicable OU1 monitoring data will be tabulated along with OU2 data and used in data evaluation.

6.3.3 Wetland Evaluation

Specific procedures for the long-term monitoring and maintenance of the restored wetland have been included in Section 4, above, and in the Wetlands Restoration Plan. Sample inspection checklists and maintenance schedules for wetlands restoration are presented in Appendix A.

6.3.4 Site Security

Site security inspections will be conducted consistent with the Phase II Site Security Plan (Dames & Moore, 1996). Quarterly inspections of the entire length of fence will be conducted. The presence of warning signs every 100 feet will be verified.

Minor maintenance and hand repairs, such as lock replacement and simple fence fabric mending will be completed during the inspection. Conditions requiring more extensive repair or maintenance will be reported to the City's Project Manager within 24 hours of the inspection. Subsequent corrective measures will be undertaken promptly.

6.3.5 ARAR and Institutional Control Compliance

The general site inspection will once each year specifically focus on inspections for violations of ARARs or Institutional Controls. In accordance with Section VII.F of the SOW-OU2, the O&M team will verify both in the field, and with the appropriate officials of the City, that:

- The area within OU2 is not being developed for any use other than as a golf course;
- Ground water wells have not been installed within the OU2 area, and ground water underlying the OU2 area is not being used for drinking water;
- Intrusive earthwork activities below the top six inches of soil, are not being undertaken within OU2;
- Remedial measures installed during RA have not been disturbed during the post-closure period. Such remedial measures may include monitoring wells, sampling stations, surveying benchmarks, or other facilities necessary for the continued long-term operation and maintenance of remedial measures, and

- Removal of potentially contaminated sediments or soils from the property within OU2 has not occurred.

A sample Institutional Control checklist is included in Appendix A. All violations of Institutional Controls will be reported to the City's Project Manager within 24 hours, and to USEPA within 30 days. Subsequent corrective measures will be proposed and implemented promptly.

6.4 OPERATION & MAINTENANCE REPORTING

⇒ An annual O&M report will be prepared and submitted to USEPA and MADEP no later than the 30th of January of each year, beginning with the first January after USEPA approves the Final Remedial Construction Report. Annual reports will include the following details.

- A description of sampling events during the previous year, including sampling dates, and sample locations shown on a map of the site;
- Tables showing laboratory analytical results, including comparisons with any environmental standards, performance standards and data collected by OU1 when available.
- Evaluation of any data collected, with statistical analysis where appropriate, indicating any trends or anomalies;
- Description of site conditions during inspections, and
- Description of all corrective measures taken during the previous year.
- During the first three years of the O&M period, description of the wetland restoration evaluation in accordance with Section 4, above.

Appropriate completed inspection checklists and maintenance schedules will be appended to the annual O&M reports.

In year five of the O&M period, and if necessary every five years thereafter, a "Five Year Review" report will be prepared in accordance with Section 121 (c) of CERCLA and the National Contingency Plan (40 CFR Section 300.430(f)). The format and content of the Five Year Review Report will be proposed for USEPA approval as part of the submission of the final O&M Plan.

6.5 OPERATION & MAINTENANCE COST ESTIMATE

Section 7.1.2 of the RD Work Plan indicated that an annual budget estimate would be included in the O&M Plan. The RD Work Plan included this provision to be consistent with Section 2.3.3 and Exhibit B-1 of the Superfund Remedial Design and Remedial Action (RD/RA) Guidance (OSWER Directive 9355.0-4A). The RD/RA Guidance reflects the need for a cooperative agreement with the state in the event that the state needs to assume the O&M activities and costs. OU2 O&M is the responsibility of the City. The likelihood is great that the work will be performed by the City itself, although the City may elect to contract the work to others. Given this situation, many of the cost inputs, e.g., labor rates, cannot be fixed at this time. Provision of the O&M annual budget estimate, therefore, is deferred until submittal of the final O&M Plan.

7.0 REFERENCES

- Dames & Moore. 1996a. "30% Remedial Design Report (Appendix H to Wetlands Restoration Plan), Sullivan's Ledge Superfund Site, New Bedford, Massachusetts." Prepared for AVX Corporation.
- Dames & Moore. 1996b. "Phase II Site Security Plan, Second Operable Unit, Sullivan's Ledge Superfund Site." Prepared for AVX Corporation.
- Dames & Moore and Earthplans. 1996. Wetland Baseline Characterization Report (Appendix G to 30% Remedial Design Report), Sullivan's Ledge Superfund Site, New Bedford, Massachusetts." Prepared for AVX Corporation.
- United States Army Corps of Engineers, New England Division. 1991. "Wetland Delineation Standards."
- United States Environmental Protection Agency. 1986. "Superfund Remedial Design Guidance." OSWER Directive 9355.0-4A.
- United States Environmental Protection Agency. 1992a. "Remedial Design/Remedial Action Statement of Work, Sullivan's Ledge Superfund Site, Second Operable Unit."

TABLE 1-1
SYNOPSIS OF ENVIRONMENTAL MONITORING
PROGRAM REQUIREMENTS

Section IX.B.1.d. REQUIREMENT	HOW ADDRESSED
i.(a) Monitoring of air emissions	<p>1. During excavation, storage, treatment and disposal activities, air monitoring will be addressed in accordance with the Air Monitoring Program outlined in Section V.A. of the SOW-OU2 and submitted in the 95% RD in the draft Implementation Plan and the Division 2 Technical Specifications.</p> <p>2. After completion of construction, air monitoring will be addressed in accordance with this Section 2 of the O&M Plan.</p>
i.(b) Monitoring of sediment/soils, surface waters, dewatering effluent to determine compliance with cleanup and performance standards.	Demonstration of compliance with performance standards is included in the Closure Plan, a part of the draft Implementation Plan required in accordance with Section VIII.C.1.d.iii (d) and submitted under separate cover as part of the 95% RD.
i.(c) Assessment of wetlands to determine the success of wetlands restoration program.	Wetland restoration monitoring was presented originally in the Wetland Restoration Plan, Appendix H of the 30% RD, and is included as Part 4 of this O&M Plan.
i.(d) Testing (for PCBs) of soils to be used as fill in wetlands restoration.	Soils testing during construction is included in the Excavation Plan, a part of the draft Implementation Plan required in accordance with Section VIII.C.1.d.iii (d) and submitted under separate cover as part of the 95% RD. Soils testing is also addressed in Division 2 Technical Specifications.

Section IX.B.1.d. REQUIREMENT	HOW ADDRESSED
i.(e) A schedule for monitoring all required media.	<p>1. The schedule for monitoring during construction will be included in the RA Work Plan.</p> <p>2. The post-construction monitoring schedule is addressed in Section 2, and in Section 6 of this O&M Plan</p>
i.(f) List of analytes, analytical methods and detection limits.	<p>1. The analytical program for monitoring during construction is required by the Division 2 Technical Specifications of the 95% RD to be included in the RA Work Plan.</p> <p>2. The post-construction monitoring analytical program is addressed in this Section 2 of this O&M Plan</p>
i.(g) Work plans for monitoring activities developed in accordance with Sections IV, V, VI, and VII of the SOW-OU2	Work plans for monitoring activities are divided between the RD or RA documents with which the activities are associated. For example, this O&M Plan constitutes the comprehensive work plan for post construction monitoring.
i.(h) Description of criteria to be used to interpret monitoring data.	<p>1. The data evaluation criteria for monitoring during construction is included in the Division 2 Technical Specifications of the 95% RD and in the draft Implementation Plan.</p> <p>2. The post-construction monitoring data evaluation criteria are addressed in Section 2, and elsewhere in this O&M Plan</p>

Section IX.B.1.d. REQUIREMENT	HOW ADDRESSED
i.(i) Description of sampling locations for each media	<p>1. The sampling locations for monitoring during construction will be included in the RA Work Plan.</p> <p>2. The sampling locations for post-construction monitoring are addressed in Section 2 of this O&M Plan</p>
i.(j) Provision that monitoring shall be consistent with the sampling points, sampling frequencies, analytical parameters and duration of sampling as described in the SOW-OU2.	The SOW-OU2 requirements have been used as the foundation for the short term and long-term monitoring programs, and the appropriate sections of the SOW-OU2 are referenced throughout.
i.(k) A time schedule for submitting monitoring reports.	<p>1. The schedule for reporting during construction will be included in the RA Work Plan.</p> <p>2. The post-construction reporting schedule is addressed in Section 6 of this O&M Plan.</p>
ii. Requirements for the content of monitoring reports.	<p>1. The monitoring report content and format for monitoring during construction will be included in the RA Work Plan.</p> <p>2. The post-construction monitoring report content and format is addressed in Section 6 of this O&M Plan</p>

TABLE 2-1

ANALYTICAL METHODS, LONG-TERM ENVIRONMENTAL MONITORING

Parameter	Matrix	Analytical Method
PCBs	surface water	SW3520/SW8080 or SW8081
	sediment	SW3550/SW8080 or SW8081
pH (field test)	surface water	USEPA 150.1
Total Organic Carbon	sediment	Llyod Kahn Method

Notes:

SW - Test Methods for Evaluating Solid Wastes, Physical and Chemical Methods, SW-846 Third Edition, UpDate II, USEPA, September 1994, or most recent edition.

USEPA - Method for the Chemical Analysis of Water and Wastewater, USEPA 600-4-70-020, USEPA, 1983.

Llyod Kahn Method - Determination of Total Organic Carbon in Sediment, USEPA Region II, Environmental Sciences Division, Monitoring Management Branch, Edison, New Jersey, July 27, 1988.

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i.(b) Monitoring of sediment/soils, surface waters, dewatering effluent to determine compliance with cleanup and performance standards.	Demonstration of compliance with performance standards is included in the Closure Plan, a part of the draft Implementation Plan required in accordance with Section VIII.C.1.d.iii (d) and submitted under separate cover as part of the 95% RD.
i.(c) Assessment of wetlands to determine the success of wetlands restoration program.	Wetland restoration monitoring was presented originally in the Wetland Restoration Plan, Appendix H of the 30% RD, and is included as Part 4 of this O&M Plan.
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i.(f) List of analytes, analytical methods and detection limits.	<p>1. The analytical program for monitoring during construction is required by the Division 2 Technical Specifications of the 95% RD to be included in the RA Work Plan.</p> <p>2. The post-construction monitoring analytical program is addressed in this Section 2 of this O&M Plan</p>
i.(g) Work plans for monitoring activities developed in accordance with Sections IV, V, VI, and VII of the SOW-OU2	Work plans for monitoring activities are divided between the RD or RA documents with which the activities are associated. For example, this O&M Plan constitutes the comprehensive work plan for post construction monitoring.
i.(h) Description of criteria to be used to interpret monitoring data.	<p>1. The data evaluation criteria for monitoring during construction is included in the Division 2 Technical Specifications of the 95% RD and in the draft Implementation Plan.</p> <p>2. The post-construction monitoring data evaluation criteria are addressed in Section 2, and elsewhere in this O&M Plan</p>

Section IX.B.1.d. REQUIREMENT	HOW ADDRESSED
i.(i) Description of sampling locations for each media	<p>1. The sampling locations for monitoring during construction will be included in the RA Work Plan.</p> <p>2. The sampling locations for post-construction monitoring are addressed in Section 2 of this O&M Plan</p>
i.(j) Provision that monitoring shall be consistent with the sampling points, sampling frequencies, analytical parameters and duration of sampling as described in the SOW-OU2.	The SOW-OU2 requirements have been used as the foundation for the short term and long-term monitoring programs, and the appropriate sections of the SOW-OU2 are referenced throughout.
i.(k) A time schedule for submitting monitoring reports.	<p>1. The schedule for reporting during construction will be included in the RA Work Plan.</p> <p>2. The post-construction reporting schedule is addressed in Section 6 of this O&M Plan.</p>
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Notes:

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TABLE 3-1

ARARs REVIEW DURING OPERATION & MAINTENANCE

<u>Requirement</u>	<u>Requirement Synopsis (From ROD)</u>	<u>Long-Term Monitoring for Compliance</u>
Clean Water Act (CWA) Section 404(b)(1) Guidelines for Disposal of Dredged or Fill Material (33 U.S.C. § 1344) (40 CFR Part 230) (33 CFR 320-330)	No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the discharge which would have a less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences, or violate specific effluent limitations. Appropriate and practicable steps must be taken which will minimize the potential adverse impacts of the discharge of the dredged material on the aquatic ecosystem.	Inspect Middle Marsh and Adjacent Wetland for evidence of erosion or unauthorized filling.
Statement of Procedures on Floodplain Management and Wetlands Protection (40 CFR 6, App. A)	Federal agencies shall avoid, wherever possible, the long and short term impacts associated with the destruction of wetlands and the occupancy and modifications of floodplains and wetlands development wherever there is a practicable alternative in accordance with Executive Orders 11990 and 11988. The agency shall promote the preservation and restoration of floodplains so that their natural and beneficial values can be realized. Any plans for actions in wetlands or floodplains must be submitted for public review.	Inspect OU2 area for evidence of waterway obstruction, erosion, unauthorized filling. Monitor wetland restoration and take appropriate corrective actions if damage is encountered.
Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)	Under 662, any modification of a body of water requires consultation with the U.S. Fish and Wildlife Services, to develop measures to prevent, mitigate, or compensate for losses to fish and wildlife. This requirement is addressed under CWA Section 404 requirements.	No long-term O&M activity is associated with this ARAR.
RCRA Location Standards (40 CFR 264.18(b))	This regulation outlines the requirements for constructing an RCRA facility on a 100-year floodplain. Specifically, a RCRA facility that is located on a 100-year floodplain must be designated, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless waste may be removed safely before floodwater can reach the facility or no adverse effects on human health and the environment would result if washout occurred.	No long-term O&M activity is associated with this ARAR.

**TABLE 3-1
ARARs REVIEW DURING OPERATION & MAINTENANCE**

<u>Requirement</u>	<u>Requirement Synopsis (From ROD)</u>	<u>Long-Term Monitoring for Compliance</u>
Massachusetts Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste. As part of these requirements, a facility may not be located within a wetland or bordering a vegetated wetland, or within a 100-year floodplain, unless approved by the state.	No long-term O&M activity is associated with this ARAR.
Massachusetts Wetlands Protection Act (M.G.L. 131, § 40) (310 CMR 10.00)	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting of inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated. Each remedial alternative will be evaluated for its ability to attain regulatory performance standards, including mitigation of impacted wetlands.	Monitor wetland restoration in accordance with Wetlands Restoration Plan (Appendix H to the approved 30% RD) and O&M Plan and take appropriate corrective actions if damage is encountered.
Massachusetts Endangered Wildlife and Wild Plants Regulations (321 CMR 8.00)	These regulations established Massachusetts' list of threatened and endangered species and species of special concern. The habitat of any species listed under this requirement is protected by the regulations promulgated under the MA Wetlands Protection Act.	Long-term monitoring for this ARAR is included in the monitoring procedures of the WRP and Operations and Maintenance Plan.
Massachusetts Wetlands Protection Program Policy 90-2; Standards and Procedures for Determining Adverse Impacts to Rare Species	This policy clarifies the rules regarding rare species habitat contained at 310 CMR 10.59.	Long-term monitoring for this ARAR is included in the monitoring procedures of the WRP and Operations and Maintenance Plan.

TABLE 3-1
ARARs REVIEW DURING OPERATION & MAINTENANCE

<u>Requirement</u>	<u>Requirement Synopsis (From ROD)</u>	<u>Long-Term Monitoring for Compliance</u>
National Pollution Discharge Elimination System (NPDES) Clean Water Act (CWA) (40 CFR 122.125) (40 CFR 125)	Regulates the discharge of water into public surface waters. Among other things, major requirements are: <ul style="list-style-type: none"> • Use of best available technology (BAT) economically achievable is required to control toxic and non-conventional pollutants. Use of best conventional pollutant control technology (BCT) is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis. • Applicable Federally approved State water quality standards must be complied with. These standards may be in addition to or more stringent than other Federal standards under the CWA. 	Discharge is only during remedial construction. No long-term O&M activity is associated with this ARAR.
Toxic Pollutant Effluent Standards (40 CFR 129)	Regulates the discharge of the following pollutants: aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, and PCBs.	Discharge is only during remedial construction. No long-term O&M activity is associated with this ARAR.
Massachusetts Surface Water Quality Standards (314 CMR 3.00 and 4.00)	These standards designated the most sensitive uses for which the various waters of the Commonwealth shall be enhanced, maintained and protected. Minimum water quality criteria required to sustain the designated uses are established. Federal AWQC are to be considered in determining effluent discharge limits. Where recommended limits are not available, site-specific limits shall be developed. Any on-site water treatment and discharge is subject to these requirements.	Discharge is only during remedial construction. No long-term O&M activity is associated with this ARAR.
Massachusetts Certification for Dredging, Dredged Material Disposal, and Filling In Waters (314 CMR 9.00)	The substantive portions of these regulations establish criteria and standards for the dredging, handling and disposal of fill material and dredged material.	Monitoring of surface water and sediment will be performed in accordance with the O&M Plan to verify continued compliance.

TABLE 3-1
ARARs REVIEW DURING OPERATION & MAINTENANCE

<u>Requirement</u>	<u>Requirement Synopsis (From ROD)</u>	<u>Long-Term Monitoring for Compliance</u>
TSCA, Subpart D, Storage and Disposal (40 CFR 761.60, 761.65, 761.79)	<p>All dredged materials that contain PCBs at concentrations of 50 ppm or greater shall be disposed of in an incinerator or in a chemical waste landfill or, upon application, using a disposal method to be approved by the EPA Region in which the PCBs are located. On-site storage facilities for PCBs shall meet, at a minimum, the following criteria:</p> <ul style="list-style-type: none"> • Adequate roof and walls to prevent rain • Adequate floor with continuous curbing • No openings that would permit liquids to flow from curbed area • Not located at a site that is below the 100-year flood water elevation 	No long-term O&M activity is associated with this ARAR.
Massachusetts Supplemental Requirements for Hazardous Waste Management Facilities (314 CMR 8.00)	Water treatment units which are exempted from M.G.L.c.21C and which treat, store, or dispose of hazardous wastes generated at the same site are regulated to ensure that such activities are conducted in a manner which protects public health and safety and the environment.	Discharge is only during remedial construction. No long-term O&M activity is associated with this ARAR.
Massachusetts Hazardous Waste Regulations (310 CMR 30.000)	Regulate the generation, storage, collection, transport, treatment, disposal, use, reuse, and recycling of hazardous waste in Massachusetts. The regulations provide procedural standards for the following: generators (310 CMR 30.300), general management standards for all facilities (301 CMR 30.510), contingency plan, emergency procedures, preparedness, and prevention (310 CMR 30.520), manifest system (310 CMR 30.530), closure (310 CMR 30.580), ground water protection (310 CMR 30.660), use and management of containers (310 CMR 30.680), land disposal restrictions (310 CMR 30.760).	No long-term O&M activity is associated with this ARAR for OU2.

TABLE 3-1
ARARs REVIEW DURING OPERATION & MAINTENANCE

<u>Requirement</u>	<u>Requirement Synopsis (From ROD)</u>	<u>Long-Term Monitoring for Compliance</u>
Interim Sediment Quality Criteria	These criteria were developed by U.E. EPA for certain hydrophobic organic compounds, including PCBs, to protect benthic organisms. The criteria for PCBs is 19.5 µg PCB/g organic carbon.	Monitoring of sediment/soil will be performed in accordance with the O&M Plan to verify continued compliance.
Massachusetts Allowable Ambient Air Limits - Annual (AALs) and 24-hour (TELs)	These guidances are to be considered in evaluating whether a condition of air pollution exists. The TEL for PCB is 0.003 µg/m ³ and the AAL is 0.005 µg/m ³ .	Emissions anticipated only during remedial construction. No long-term O&M activity is associated with this ARAR.
Guidance on Remedial Actions for Superfund Sites with PCB Contamination	Describes various scenarios and considerations pertinent to determining the appropriate level of PCBs that can be left in each contaminated media to achieve protection of human health and the environment.	Monitoring of sediment/soil will be performed in accordance with the O&M Plan to verify continued compliance.
EPA Interim Policy for Planning and Implementing CERCLA Response Actions. Proposed Rule (50 FR 45933) (November 5, 1985)	Discusses the need to consider treatment, recycling, and reuse before offsite land disposal is used. Prohibits use of an RCRA facility for offsite management of Superfund hazardous substances if it has significant RCRA violations.	No long-term O&M activity is associated with this ARAR.
RCRA, Land Disposal Regulations (40 CFR 268, Subpart C)	Prohibits the disposal of RCRA hazardous waste in the land unless treatment standards are met or a treatability variance is obtained.	No long-term O&M activity is associated with this ARAR.
Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS) (40 CFR 50.6)	The maximum primary and secondary 24-hr. concentration for particulate emissions from site excavation activities must be maintained below 150 micrograms per cubic meter (mg/m ³), 24-hour average for particulates having a mean diameter of 10 micrometers or less. The annual standard is 50 mg/m ³ , annual arithmetic mean.	Emissions anticipated only during remedial construction. No long-term O&M activity is associated with this ARAR.
Massachusetts Ambient Air Quality Standards and Massachusetts Air Pollution Control Regulations (310 CMR 7.00) (310 CMR 6.00, 7.00 and 8.00)	The applicable portions of these regulations prohibit burning or emissions of dust which causes or contributes to a condition of air pollution.	Emissions anticipated only during remedial construction. No long-term O&M activity is associated with this ARAR.

**TABLE 3-1
ARARs REVIEW DURING OPERATION & MAINTENANCE**

<u>Requirement</u>	<u>Requirement Synopsis (From ROD)</u>	<u>Long-Term Monitoring for Compliance</u>
Federal Noise Control Act (40 CFR 204, 205, 211)	Regulates construction and transportation equipment noise, process equipment & noise levels, and noise levels at the property boundaries of the project.	No long-term O&M activity is associated with this ARAR.
Toxic Substance Control Act (TSCA), Subpart G, PCB Spill Clean-up Policy (40 CFR § 761.120-135)	Sets cleanup levels for PCB spills of 50 ppm or greater at 10 ppm for nonrestricted access areas, and 25 ppm for restricted access areas.	Monitoring of sediment/soil will be performed in accordance with the O&M Plan to verify continued compliance.

TABLE 4-1
PRE-REMEDIATION WETLAND COVER COMPOSITION

Wetland Type	Stratum	Pre-remediation areal coverage (range) %	Pre-remediation areal coverage mean %
Adjacent Wetland - Emergent	Herbaceous (<u>Phragmites</u>)	107% ¹	107%
Adjacent Wetland-Scrub-Shrub	Herbaceous	66.5%	66.5%
Adjacent Wetland-Scrub-Shrub	Shrub	54.5%	54.5%
Adjacent Wetland Forested	Trees	70%	70%
Adjacent Wetland Forested	Herbaceous	27%	27%
Adjacent Wetland Forested	Shrub	41.5%	55%
Middle Marsh-Emergent	Herbaceous (<u>Phragmites</u>)	79.5% to 96%	87%
Middle Marsh-Scrub-Shrub	Herbaceous	22.5% to 92%	53%
Middle Marsh-Scrub-Shrub	Shrub	24% to 73.5%	43%
Middle Marsh-Forested	Herbaceous	28.5% to 85%	50%
Middle Marsh-Forested	Shrub	21% to 77%	54%
Middle Marsh-Forested	Trees	38% to 94%	70%

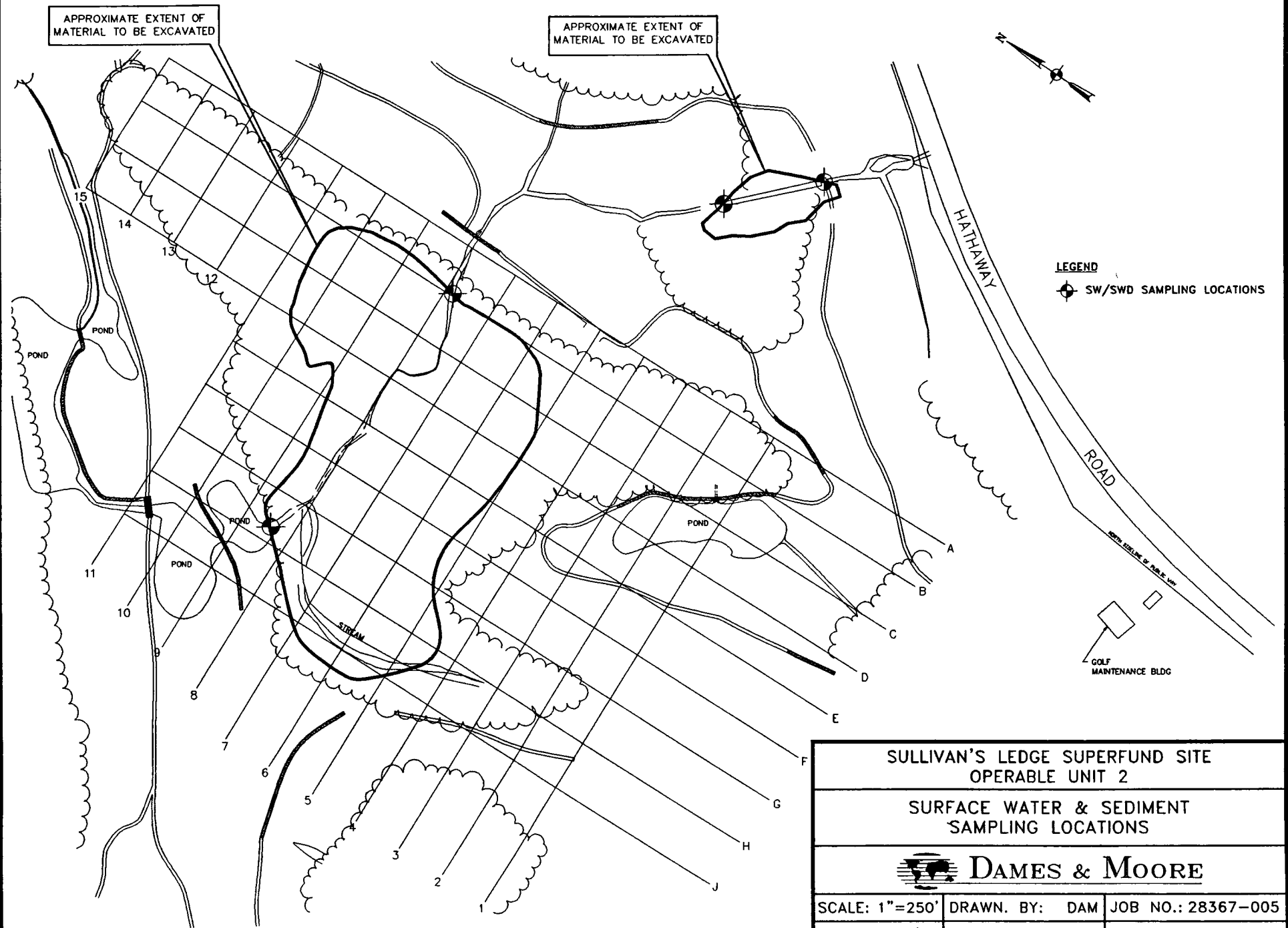
1. Greater than 100% since more than one stratum considered.

**Table 6-1
OPERATION AND MAINTENANCE SCHEDULE**

TASK #	Task Name	Start Date	End Date	Duration in Days
1	OPERABLE UNIT 2	1/2/80	8/5/03	8,407.00d
2	POST-CLOSURE MONITORING	11/1/98	8/5/03	1,696.00d
3	First Year Monitoring	11/1/98	8/5/99	271.00d
4	Fall Inspection	11/1/98	11/5/98	5.00d
5	General Inspection	11/1/98	11/5/98	5.00d
6	Site Security	11/1/98	11/5/98	5.00d
7	Institutional Controls	11/1/98	11/5/98	5.00d
8	Winter Inspection	2/1/99	2/5/99	5.00d
9	General Inspection	2/1/99	2/5/99	5.00d
10	Site Security	2/1/99	2/5/99	5.00d
11	Spring Inspection	5/1/99	5/5/99	5.00d
12	General Inspection	5/1/99	5/5/99	5.00d
13	Site Security	5/1/99	5/5/99	5.00d
14	Wetland Evaluation including MVA	5/1/99	5/5/99	5.00d
15	Summer Inspection	8/1/99	8/5/99	5.00d
16	General Inspection	8/1/99	8/5/99	5.00d
17	Site Security	8/1/99	8/5/99	5.00d
18	Environmental Monitoring	8/1/99	8/5/99	5.00d
19	Wetland Evaluation	8/1/99	8/5/99	5.00d
20	Second Year Monitoring	11/1/99	8/5/00	273.00d
21	Fall Inspection	11/1/99	11/5/99	5.00d
22	General Inspection	11/1/99	11/5/99	5.00d
23	Site Security	11/1/99	11/5/99	5.00d
24	Institutional Controls	11/1/99	11/5/99	5.00d
25	Winter Inspection	2/1/00	2/5/00	5.00d
26	General Inspection	2/1/00	2/5/00	5.00d
27	Site Security	2/1/00	2/5/00	5.00d
28	Spring Inspection	5/1/00	5/5/00	5.00d
29	General Inspection	5/1/00	5/5/00	5.00d
30	Site Security	5/1/00	5/5/00	5.00d
31	Wetland Evaluation including MVA	5/1/00	5/5/00	5.00d
32	Summer Inspection	8/1/00	8/5/00	5.00d
33	General Inspection	8/1/00	8/5/00	5.00d
34	Site Security	8/1/00	8/5/00	5.00d
35	Environmental Monitoring	8/1/00	8/5/00	5.00d
36	Wetland Evaluation	8/1/00	8/5/00	5.00d
37	Third Year Monitoring	11/1/00	8/5/01	270.00d
38	Fall Inspection	11/1/00	11/5/00	5.00d
39	General Inspection	11/1/00	11/5/00	5.00d
40	Site Security	11/1/00	11/5/00	5.00d
41	Institutional Controls	11/1/00	11/5/00	5.00d
42	Winter Inspection	2/1/01	2/5/01	5.00d
43	General Inspection	2/1/01	2/5/01	5.00d
44	Site Security	2/1/01	2/5/01	5.00d
45	Spring Inspection	5/1/01	5/5/01	5.00d

**Table 6-1
OPERATION AND MAINTENANCE SCHEDULE**

TASK #	Task Name	Start Date	End Date	Duration in Days
				5.00d
46	General Inspection	5/1/01	5/5/01	5.00d
47	Site Security	5/1/01	5/5/01	5.00d
48	Wetland Evaluation including MVA	5/1/01	5/5/01	5.00d
49	Summer Inspection	8/1/01	8/5/01	5.00d
50	General Inspection	8/1/01	8/5/01	5.00d
51	Site Security	8/1/01	8/5/01	5.00d
52	Environmental Monitoring	8/1/01	8/5/01	5.00d
53	Wetland Evaluation	8/1/01	8/5/01	5.00d
54	Fourth Year Monitoring	11/1/01	8/5/02	271.00d
55	Fall Inspection	11/1/01	11/5/01	5.00d
56	General Inspection	11/1/01	11/5/01	5.00d
57	Site Security	11/1/01	11/5/01	5.00d
58	Institutional Controls	11/1/01	11/5/01	5.00d
59	Spring Inspection	5/1/02	5/5/02	5.00d
60	General Inspection	5/1/02	5/5/02	5.00d
61	Site Security	5/1/02	5/5/02	5.00d
62	Summer Inspection	8/1/02	8/5/02	5.00d
63	General Inspection	8/1/02	8/5/02	5.00d
64	Site Security	8/1/02	8/5/02	5.00d
65	Fifth Year Monitoring	11/1/02	8/5/03	271.00d
66	Fall Inspection	11/1/02	11/5/02	5.00d
67	General Inspection	11/1/02	11/5/02	5.00d
68	Site Security	11/1/02	11/5/02	5.00d
69	Institutional Controls	11/1/02	11/5/02	5.00d
70	Spring Inspection	5/1/03	5/5/03	5.00d
71	General Inspection	5/1/03	5/5/03	5.00d
72	Site Security	5/1/03	5/5/03	5.00d
73	Wetland Evaluation	5/1/03	5/5/03	5.00d
74	Summer Inspection	8/1/03	8/5/03	5.00d
75	General Inspection	8/1/03	8/5/03	5.00d
76	Site Security	8/1/03	8/5/03	5.00d
77	Environmental Monitoring	8/1/03	8/5/03	5.00d
78	Wetland Evaluation	8/1/03	8/5/03	5.00d



SULLIVAN'S LEDGE SUPERFUND SITE
OPERABLE UNIT 2

SURFACE WATER & SEDIMENT
SAMPLING LOCATIONS



DAMES & MOORE

SCALE: 1"=250'	DRAWN. BY: DAM	JOB NO.: 28367-005
DATE: 8/96	APPR. BY: MMW	FIGURE NO.: 2-1

APPROXIMATE EXTENT OF
MATERIAL TO BE EXCAVATED

APPROXIMATE EXTENT OF
MATERIAL TO BE EXCAVATED

KEY

② PIEZOMETER LOCATIONS

ⓧ APPROXIMATE LOCATION OF MONITORING WELL 10A

NOTE:

PIEZOMETER LOCATION 4 IN
ADJACENT WETLAND COULD
NOT BE INSTALLED

FENCE

HATHAWAY
ROAD

ROAD

NORTH SIDE OF PUBLIC WAY

GOLF
MAINTENANCE BLDG.

LEGEND

PFO1 PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS

PFO/SS1 PALUSTRINE, FORESTED/SCRUB-SHRUB BROAD-LEAVED DECIDUOUS


PSS1 PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS

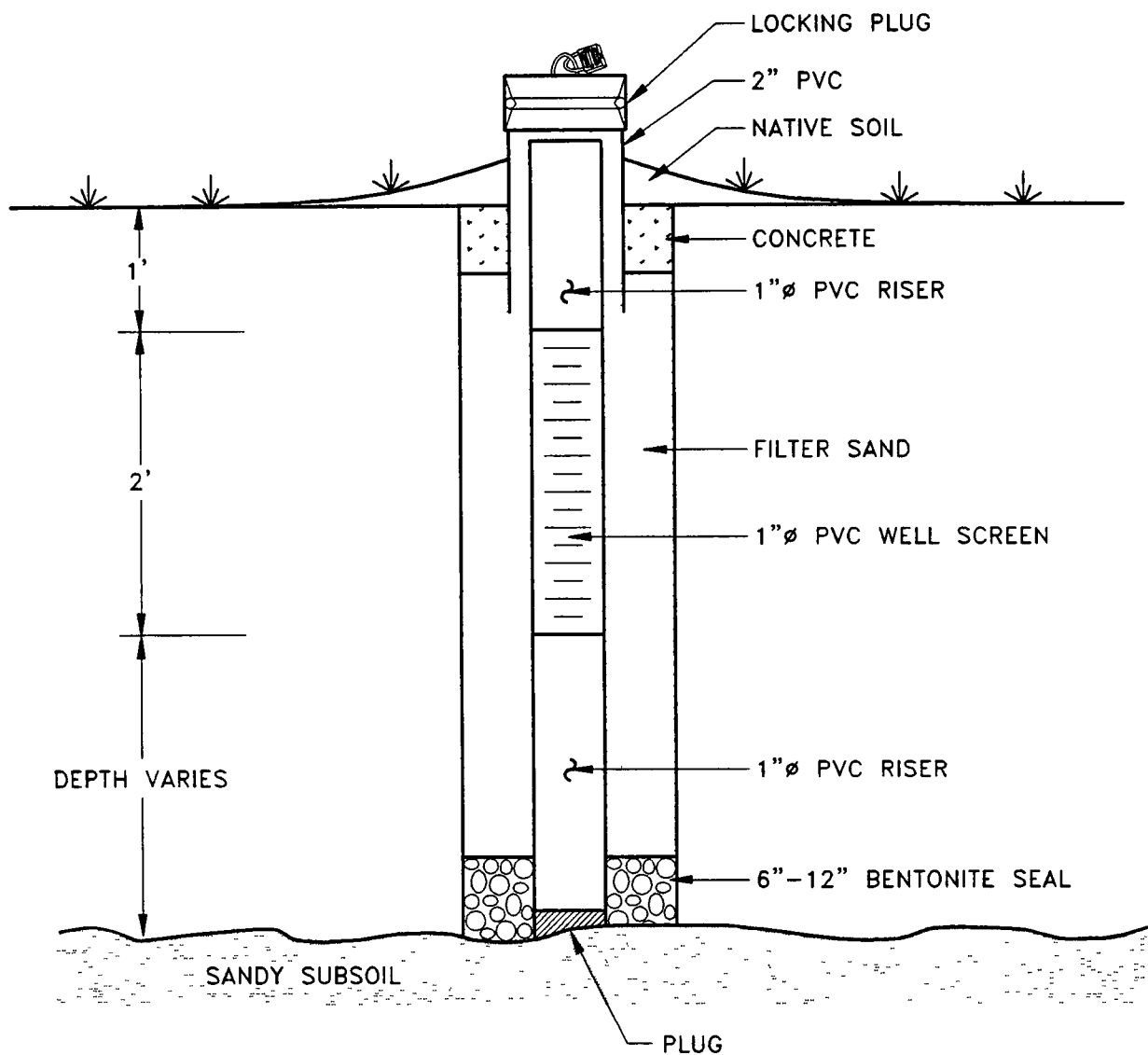
PSS/EM1 PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS/
EMERGENT, PERSISTENT

PEM1 PALUSTRINE, EMERGENT, PERSISTENT

UPLAND

PFO1 PFO1 WITH AREAS OF PHRAGMITES.

TITLE	SULLIVAN'S LEDGE SUPERFUND SITE - OPERABLE UNIT 2			
PROJECT	PIEZOMETER LOCATIONS			
 DAMES & MOORE				
SCALE	1"=200'	DWN. BY	DAM	JOB NO. 28367-005
DATE 12/18/95	APPR. BY	WSB	FIG. NO.	4-1



PIEZOMETER DETAIL

AVX CORPORATION
SULLIVAN'S LEDGE SUPERFUND SITE
OPERABLE UNIT 2



DAMES & MOORE

SCALE	NTS	DRAWN BY	DAM	JOB NO. 28367-005
DATE 7/30/96	APPR. BY	GMG	FIG. NO.	4-2

APPENDIX A
INSPECTION CHECKLISTS

SULLIVAN'S LEDGE SUPERFUND SITE**OPERABLE UNIT 2 SITE INSPECTION CHECKLIST****FALL INSPECTION**

GENERAL/SITE SECURITY/INSTITUTIONAL CONTROL

FIELD O&M TEAM LEADER:

OTHER FIELD TEAM MEMBER(S):

DATE & TIME OF INSPECTION:

FROM

A.M. TO

P.M.

CONDITION

(Check)

GENERAL INSPECTION

Acceptable

Not Acceptable

REMARKS

Accumulation of litter or debris			
Evidence of erosion damage			
Health of upland vegetative cover			
Drainage obstruction			
Condition of roads and paths			
Other observations			

CONDITION

(Check)

SITE SECURITY

Acceptable

Not Acceptable

REMARKS

Fence fabric integrity			
Fence posts straight			
Fence rails			
Condition of gates			
Locks secure and functioning			
Warning signs every 100' and secure			

INSTITUTIONAL CONTROLS COMPLIANCE	CONDITION (Check)		REMARKS
	Present	Not Present	
Site development or use other than for golf			
New groundwater wells			
Evidence of intrusive earthwork.			
Evidence of soils being removed from area			
Evidence of tampering with existing site feature (sells, survey markers, etc.)			
Any other observations			

Field Inspection Certified Complete By:

Field Team Leader

Date

SULLIVAN'S LEDGE SUPERFUND SITE**OPERABLE UNIT 2 SITE INSPECTION CHECKLIST****WINTER INSPECTION****GENERAL/SITE SECURITY**

FIELD O&M TEAM LEADER:

OTHER FIELD TEAM MEMBER(S):

DATE & TIME OF INSPECTION:

FROM

A.M. TO

P.M.

CONDITION**(Check)****GENERAL INSPECTION****Acceptable****Not Acceptable****REMARKS**

Accumulation of litter or debris			
Evidence of erosion damage			
Health of upland vegetative cover			
Drainage obstruction			
Condition of roads and paths			
Other observations			

CONDITION**(Check)****SITE SECURITY****Acceptable****Not Acceptable****REMARKS**

Fence fabric integrity			
Fence posts straight			
Fence rails			
Condition of gates			
Locks secure and functioning			
Warning signs every 100' and secure			

Field Inspection Certified Complete By:

Field Team Leader_____
Date

SULLIVAN'S LEDGE SUPERFUND SITE**OPERABLE UNIT 2 SITE INSPECTION CHECKLIST****SPRING INSPECTION****GENERAL/SITE SECURITY/ENVIRONMENTAL MONITORING/WETLAND EVALUATION****FIELD O&M TEAM LEADER:****OTHER FIELD TEAM MEMBER(S):****DATE & TIME OF INSPECTION:** FROM A.M. TO P.M.**CONDITION (Check)**

GENERAL INSPECTION	Acceptable	Not Acceptable	REMARKS
---------------------------	-------------------	-----------------------	----------------

Accumulation of litter or debris			
Evidence of erosion damage			
Health of upland vegetative cover			
Drainage obstruction			
Condition of roads and paths			
Other observations			

CONDITION (Check)**Not Acceptable****SITE SECURITY****Acceptable****REMARKS**

Fence fabric integrity			
Fence posts straight			
Fence rails			
Condition of gates			
Locks secure and functioning			
Warning signs every 100' and secure			

WETLAND EVALUATION

MYSTIC VALLEY AMPHIPOD (MVA)	Completed	Not Completed	REMARKS
Collection of MVA samples			
Identification and enumeration of MVA			
Observations of MVA habitat characteristics			
Preparation of MVA data report			

Wetlands Hydrology Monitoring

	Completed	Not Completed	REMARKS
Measuring of groundwater levels - April			
Measuring of groundwater levels - June			

Field Inspection Certified Complete By:

Field Team Leader

Date

SULLIVAN'S LEDGE SUPERFUND SITE**OPERABLE UNIT 2 SITE INSPECTION CHECKLIST****SUMMER INSPECTION**

GENERAL/SITE SECURITY/ENVIRONMENTAL MONITORING/WETLAND EVALUATION

FIELD O&M TEAM LEADER:

OTHER FIELD TEAM MEMBER(S):

DATE & TIME OF INSPECTION: FROM A.M. TO P.M.

CONDITION (Check)

Not Acceptable

GENERAL INSPECTION

Acceptable

REMARKS

Accumulation of litter or debris			
Evidence of erosion damage			
Health of upland vegetative cover			
Drainage obstruction			
Condition of roads and paths			
Other observations			

CONDITION (Check)

Not Acceptable

SITE SECURITY

Acceptable

REMARKS

Fence fabric integrity			
Fence posts straight			
Fence rails			
Condition of gates			
Locks secure and functioning			
Warning signs every 100' and secure			

ENVIRONMENTAL MONITORING	Completed	Not Completed	REMARKS
Field marking of sample locations			
Collection of downstream Middle Marsh surface water sample			
Collection of downstream Middle Marsh sediment sample			
Collection of upstream Middle Marsh surface water sample			
Collection of upstream Middle Marsh sediment sample			
Collection of Adjacent Wetland surface water sample			
Collection of Adjacent Wetland sediment sample			
Collection of two wetland soil samples from Adjacent Wetland			
Collection of four wetland soil samples from Middle Marsh			
Sample preservation, packing and shipment			

WETLAND EVALUATION	Completed	Not Completed	REMARKS
Sample representative wetlands vegetation quadrats			
Record plant cover and dominance			
Photographic documentation			
Compare vegetation coverage to baseline			
Prepare annual data report			

**Wetlands Hydrology
Monitoring**

	Completed	Not Completed	REMARKS
Measure groundwater levels - August			

Field Inspection Certified Complete By:

Field Team Leader

Date

SULLIVAN'S LEDGE SUPERFUND SITE**OPERABLE UNIT 2 SITE MAINTENANCE SCHEDULE****GENERAL/SITE SECURITY/WETLAND****FIELD O&M TEAM LEADER:****OTHER FIELD TEAM MEMBER(S):****DATE & TIME OF MAINTENANCE ACTIVITY;****FROM****A.M. TO****P.M.****MAINTENANCE
PERFORMED (check)****GENERAL MAINTENANCE ITEM****REMARKS**

	Removal of litter or debris	
<div>_____ _____ _____</div>	Repair of erosion damage: <ul style="list-style-type: none">• Filling• Grading• Other (describe)	
<div>_____ _____ _____ _____ _____</div>	Care of upland vegetative cover: <ul style="list-style-type: none">• Seeding• Fertilizing• Topsoil replacement• Removal of undesired vegetation• Grass cutting• Other (describe)	
	Removal of drainage obstruction	
<div>_____ _____ _____ _____</div>	Repair of roads and paths <ul style="list-style-type: none">• Filling• Grading• Paving (asphalt or stone)• Other (describe)	
	Other maintenance (describe)	

**MAINTENANCE
PERFORMED
(check)**

SITE SECURITY MAINTENANCE ITEM

REMARKS

	Repair or replace fence fabric	
	Repair or replace fence posts	
	Repair or replace Fence rails	
	Repair or replace gates	
	Repair or replace locks	
	Repair or replace warning signs	
	Other maintenance (describe)	

**MAINTENANCE
PERFORMED
(check)**

WETLAND MAINTENANCE ITEM

REMARKS

	Evaluate conditions of tree species (height, DBH, canopy)	
	Evaluate general growth and health of restored wetland plants - replace plants if required	
	Evaluate condition of hummocks	
	Assess invasive species, corrective action if required	
	Evaluate erosion in restored wetlands, replace top soil, if required	
	Evaluate whether major impacts to restored wetlands, report to USEPA if required	
	Evaluate whether condition is too dry to support wetland plants. Irrigate if necessary.	

Field Inspection Certified Complete By:

Field Team Leader

Date